

ABSTRACT OF THE DISCLOSURE

A ceramic composite containing alkali-metal- β - or β'' -alumina and an oxygen-ion conductor is fabricated by converting α -alumina to alkali-metal- β - or β'' -alumina. A ceramic composite with continuous phases of α -alumina and the oxygen-ion conducting ceramic, such as zirconia, is exposed to a vapor containing an alkali-metal oxide, such as an oxide of sodium or potassium. Alkali metal ions diffuse through alkali-metal- β - or β'' -alumina converted from α -alumina and oxygen ions diffuse through the oxygen-ion conducting ceramic to a reaction front where α -alumina is converted to alkali-metal- β - or β'' -alumina. A stabilizer for alkali-metal- β'' -alumina is preferably introduced into the α -alumina/oxygen-ion conductor composite or introduced into the vapor used to convert the α -alumina to an alkali-metal- β'' -alumina.